CLAIMS:

Sub B4 1. A system for communicating between a plurality of nodes coupled to an optical wavelength division multiplexed ring network comprising:

a first terminal node having a communication subsystem configured to be coupled to the ring network to receive and to transmit signals at a first wavelength and to permit signals at other wavelengths to pass, a tributary subsystem configured to be coupled to a plurality of devices to enable the devices to communicate over the ring network, and a multiplexing subsystem coupled to the tributary subsystem and to the communication subsystem to channel signals between the plurality of devices and the ring network;

a second terminal node having a communication subsystem configured to be coupled to the ring network to receive and to transmit signals at a second wavelength and to permit signals at other wavelengths to pass, a tributary subsystem configured to be coupled to a plurality of devices to enable the devices to communicate over the ring network, and a multiplexing subsystem coupled to the tributary subsystem and to the communication subsystem to channel signals between the plurality of devices and the ring network.; and

a head-end node coupled to the ring network to receive and to transmit signals at both the first and second wavelengths, the head-end node having a demultiplexer to isolate signals received at the first and second wavelengths, an integral cross-connect module to determine an output wavelength at which to transmit received signals based on address information included in the received signals, and a multiplexer to combine the received signals for transmission on the ring network at the first and second wavelengths.

2. The system of claim 1, wherein the first and second communication subsystems include an optical add/drop multiplexer coupled to the ring network.

3. The system of claim 1, wherein the head-end node includes a tributary subsystem configured to be coupled to a plurality of devices to enable the devices to communicate over the ring network.

4. The system of claim 1, wherein the terminal nodes and head-end node receive and transmit signals using a synchronous optical network communication standard.

5. The system of claim 1, wherein the head-end node receives and transmits signals using a synchronous optical network communication standard, a subset of the signals further use a communication protocol framed by the communication standard, the head-end node includes at least one protocol subsystem to determine address information for the communication protocol, and the head-end node is configured to send signals using the communication protocol to the at least one protocol subsystem.

6. The system of claim 5, wherein the communication standard is one of SONET and SDH, and the communication protocol is IP.

7. The system of claim 5, wherein the communication standard is one of SONET and SDH, and the communication protocol is ATM.

8. The system of claim 5, wherein the communication standard is one of SONET and SDH, and the communication protocol is IP encapsulated within ATM.

9. The system of claim 1, wherein the head-end node receives and transmits signals using a synchronous optical network communication standard, a first subset of the signals further use a communication protocol framed by the communication standard and a second subset of the signals further use a second communication protocol framed by the communication standard, the head-end node includes first and second protocol subsystems to determine address information for the first and second communication protocols, and the head-end node is configured to send signals using the first communication protocol to the first protocol subsystem and to send signals using the second communication protocol to the second protocol subsystem.

10. The system of claim 9, wherein the first communication standard is one of SONET and SDH, the first communication protocol is IP, and the second communication protocol is ATM.

11. The system of claim 1, wherein the head-end node includes first and second transmitters coupled to the multiplexer to send signals at the first and

second wavelengths, respectively, and first and second receivers coupled to the demultiplexer to receive signals at the first and second wavelengths, respectively.

12. The system of claim 1, wherein the ring network includes a first ring for transmitting information in a clockwise direction and a second ring for transmitting information in a counter-clockwise direction, the first communication subsystem comprises a pair of transceivers coupled to the first and second rings, respectively, the second communication subsystem comprises a pair of transceivers coupled to the first and second rings, respectively, the demultiplexer comprises a pair of demultiplexers coupled to the first and second rings, respectively, and the mulitplexer comprises a pair of multiplexers coupled to the first and second rings, respectively.

13. The system of claim 12, wherein the first communication subsystem further includes a selector that compares a pair of signals received by the pair of transceivers and selects a signal from the pair of signals based on a quality parameter of each signal.

14. The system of claim 12, wherein the head-end node further includes a selector that compares a pair of signals received by the pair of demultiplexers and selects a signal from the pair of signals based on a quality parameter of each signal.

15. A system for communicating between a plurality of nodes coupled to an optical wavelength division multiplexed ring network including a first ring for transmitting information in a clockwise direction and a second ring for transmitting information in a counter-clockwise direction, the system comprising:

a head-end node coupled to the ring network to receive and to transmit signals at first and second wavelengths, the head-end node having a demultiplexer to isolate signals received from the ring network at the first and second wavelengths, a selector to select a signal from a pair of signals received from the first and second rings, respectively, based on a quality parameter of each signal, a cross-connect module to determine an output wavelength at which to transmit received signals, and a mulitplexer to combine the received signals for transmission on the ring network at the first and second wavelengths.

16. The system of claim 15, further comprising:

a first terminal node having a first communication subsystem coupled to the ring network to receive and to transmit signals at a first wavelength and to permit signals at other wavelengths to pass, the first communication subsystem including a first pair of transceivers coupled to the first and second rings, respectively, and a first selector to select a signal from the pair of signals received by the first pair of transceivers based on a quality parameter of each signal; and

a second terminal node having a second communication subsystem coupled to the ring network to receive and to transmit signals at a second wavelength and to permit signals at other wavelengths to pass, the second communication subsystem including a second pair of transceivers coupled to the first and second rings, respectively, and a second selector to select a signal from the pair of signals received by the second pair of transceivers based on a quality parameter of each signal.

17. A system for communicating between a plurality of nodes coupled to an optical wavelength division multiplexed ring network using a primary communication standard, at least some of the nodes sending and receiving signals using at least one secondary communication protocol framed by the primary communication standard, the system comprising:

a head-end node coupled to the ring network to receive and to transmit signals at first and second wavelengths, the head-end node having a demultiplexer to isolate signals received at the first and second wavelengths, a cross-connect module to determine an output wavelength at which to transmit received signals, a mulitplexer to combine the isolated received signals to transmit on the ring network at the first and second wavelengths, and at least one protocol subsystem coupled to the cross-connect module to determine address information for the at least one secondary protocol of the received signals.

18. The system of claim 17, wherein the primary communication standard is one of SONET and SDH, and the at least one secondary communication protocol includes IP.

19. The system of claim 17, wherein the primary communication standard is one of SONET and SDH, and the at least one secondary communication protocol includes ATM.

20. The system of claim 19, wherein the primary communication standard is one of SONET and SDH, and the at least one secondary communication protocol further includes IP.

21. The system of claim 19, wherein the primary communication standard is one of SONET and SDH, and the at least one secondary communication protocol further includes IP encapsulated within ATM.

22. A method of communicating signals in an optical wavelength division multiplexed ring network between two nodes using a primary communication standard and a secondary communication protocol framed by the primary communication standard comprising:

providing a first terminal node coupled to the ring network to receive and to transmit signals at a first wavelength and to permit signals at other wavelengths to pass;

providing a second terminal node coupled to the ring network to receive and to transmit signals at a second wavelength and to permit signals at other wavelengths to pass;

providing a head-end node coupled to the ring network to receive and to transmit signals at both the first and second wavelengths;

receiving signals transmitted at the first and second wavelengths at the head-end node;

determining destination address information for signals received at the head-end node based on information in the signal encoded by the secondary communication protocol; and

retransmitting signals received at the head-end node at one of the first and second wavelengths based on the destination address information.